

REMARKS

In the last Office Action, claims 36-40 and 53-68 were rejected under 35 U.S.C. §112, first paragraph, as failing to comply with the written description requirement. The drawings were objected to as failing to show every feature of the claimed invention. Claims 45-47 and 61-64 were objected to as containing informalities. Claims 36-38 and 40 were rejected under 35 U.S.C. §103(a) as being unpatentable over JP 10-112075 to Hiroshi in view of U.S. Patent No. 5,963,532 to Hajjar and further in view of U.S. Patent No. 5,881,214 to Morisawa et al. ("Morisawa") and U.S. Patent No. 4,804,198 to Lemelson. Claims 41-43, 45-47, 49-51, 53, 57, 61 and 65 were rejected under 35 U.S.C. §103(a) as being unpatentable over Hiroshi in view of Hajjar and further in view of EP 552887. Claims 39, 44, 48, 52, 54-56, 58-60, 62-64, and 66-68 were rejected under 35 U.S.C. §103(a) as being unpatentable over various combinations of the references to Hiroshi, Hajjar, Lemelson, Morisawa, Albrecht et al. (USPN 5,689,384), Ohnuki et al. (USPN 6,160,769), and Wickramasinghe et al. (USPN 5,602,820). Additional art was cited of interest.

In accordance with the present response, independent claim 41 has been amended to further patentably distinguish from the prior art of record. Independent claim 45 has been amended to overcome the claim objection.

With respect to the rejection under 35 U.S.C. §112, first paragraph, based on independent claim 36, the single linear mark is described, for example, on page 43, lines 16-21 of the specification which describes the single linear mark patterned in the form of a rod-like shape on a sample 5 and having an edge 7. With respect to the corresponding drawing objection, the embodiment of the single linear mark is shown in Fig. 2.

With respect to the rejection under 35 U.S.C. §112, first paragraph, based on claims 53-55, 57-59, 61-63, 65, 67 and 68, the embodiments of the linear mark comprising a projection, a groove or a plurality of substances having different optical properties are described on page 49, lines 18-24, of the specification.

In view of the foregoing, applicants respectfully submit that the objection to the drawings and claims and the rejection under 35 U.S.C. §112, first paragraph, have been overcome and should be withdrawn.

Applicants request reconsideration of their application in light of the foregoing amendments and the following discussion.

Brief Summary of the Invention

The present invention relates to an information reproducing apparatus and to an information reproducing method.

Conventional information reproducing apparatuses which reproduce information from a medium utilizing near-field light are known. However, as described in the specification (pgs. 1-3), the conventional information reproducing apparatuses have not been able to provide high-density reproduction of information.

The present invention overcomes the drawback of the conventional art. Figs. 1-4 show an embodiment of an information reproducing apparatus according to the present invention embodied in the claims. The information reproducing apparatus has a light source 102 for generating linearly polarized light, and a medium 101 having an information unit field and only a single linear mark 7 disposed in the information unit field. An optical head 104 is disposed between the light source 102 and the medium 101 and has a fine aperture 103. The light source 102 includes a polarized light control portion for controlling the linearly polarized light generated by the light source 102 to pass through the fine aperture 103 of the optical head 104 to generate near-field light having a preselected polarization direction and to irradiate the linear mark 7 disposed in the information unit

field of the medium 101 with the near-field light so that the preselected polarization direction of the near-field light is orthogonal to a longitudinal axis of the linear mark 7. A detector 105 detects light scattered by the linear mark 7 irradiated with the near-field light.

In another embodiment shown in Figs. 3A-3C, the medium has an information unit field and a plurality of linear marks 8' disposed in the information unit field and extending in different directions from one another. For example, linear marks 8' extending in horizontal and vertical directions form a plus (+) sign shape in Fig. 3A.

By providing a light source that includes a polarized light control portion that irradiates the linear mark of the medium with the near-field light so that the preselected polarization direction of the near-field light is orthogonal to a longitudinal axis of the linear mark, light scattered by the linear mark of the medium has an intensity which is sufficiently high to permit high-density reproduction of information. Thus, the present invention provides a high-density information reproducing apparatus.

Traversal of Prior Art Rejections

Claims 36-38 and 40 were rejected under 35 U.S.C. §103(a) as being unpatentable over Hiroshi in view of Hajjar and further in view of Morisawa and Lemelson. Applicants

respectfully traverse this rejection and submit that the combined teachings of Hiroshi, Hajjar, Morisawa and Lemelson do not disclose or suggest the subject matter recited in amended independent claim 36 and corresponding dependent claims 37, 38 and 40.

Independent claim 36 is directed to an information reproducing apparatus and requires a medium having an information unit field and only a single linear mark disposed in the information unit field. Claim 36 further requires polarized light control means for controlling the linearly polarized light generated by the light source to pass through the fine aperture of the optical head to generate near-field light having a preselected polarization direction and to irradiate the linear mark in the information unit field of the medium with the near-field light so that the preselected polarization direction of the near-field light is orthogonal to a longitudinal axis of the linear mark. No corresponding features are disclosed or suggested by the combined teachings of Hiroshi, Hajjar, Lemelson and Morisawa.

The primary reference to Hiroshi discloses an optical medium and system for reproducing/recording information thereon. While disclosing a polarized control unit that controls the polarization direction of an incoming light beam, Hiroshi does not disclose or suggest that the polarized control unit controls a linearly polarized light

generated by a light source to pass through a fine aperture of an optical head to generate near-field light having a preselected polarization direction and to irradiate a linear mark in an information unit field of a medium with the near-field light so that the preselected polarization direction of the near-field light is orthogonal to a longitudinal axis of the linear mark, as recited in independent claim 36.

The Examiner cited the secondary reference to Hajjar for its disclosure of a near-field optical system for generating near-field light. However, Hajjar does not disclose or suggest any means for irradiating a linear mark in an information unit field of a medium with the near-field light so that the preselected polarization direction of the near-field light is orthogonal to a longitudinal axis of the linear mark, as recited in independent claim 36.

Hiroshi further discloses an information recording medium (Figs. 1 and 28) having plural information unit fields 4 (i.e., pit sections). Plural linear marks are disposed in each of the information unit fields 4. Thus Hiroshi does not disclose or suggest only a single linear mark disposed in one of the information unit field, as recited in independent claim 36. Furthermore, contrary to the Examiner's contention, Fig. 7 of Lemelson and Fig. 5 of Morisawa disclose a medium having multiple linear marks, not a single linear mark.

Thus Hajjar, Lemelson and Morisawa do not cure the deficiencies of Hiroshi because the references do not disclose or suggest the foregoing features recited in independent claim 36 and which are not taught by Hiroshi. Accordingly, one ordinarily skilled in the art would not have been led to modify the references to attain the claimed subject matter.

Claims 37, 38 and 40 depend on and contain all of the limitations of independent claim 36, respectively, and, therefore, distinguish from the references at least in the same manner as claim 36.

In view of the foregoing, applicants respectfully request that the rejection of claims 36-38 and 40 under 35 U.S.C. §103(a) as being unpatentable over Hiroshi in view of Hajjar and further in view of Lemelson and Morisawa be withdrawn.

Claims 41-43, 45-47, 49-51, 53, 57, 61 and 65 were rejected under 35 U.S.C. §103(a) as being unpatentable over Hiroshi in view of Hajjar and further in view of EP 0552887. Applicants respectfully traverse this rejection and submit that the combined teachings of Hiroshi, Hajjar and EP 0552887 do not disclose or suggest the subject matter recited in independent claims 41, 45 and 49 and the corresponding dependent claims.

Independent claims 41 and 45 are directed to an information reproducing apparatus and independent claim 49 is directed to an information reproducing method. Amended claim 41 recites polarized light control means for controlling a direction of polarization of near-field light so that the direction of polarization of the near-field light irradiated on the linear marks is orthogonal to a longitudinal axis of each of the linear marks. Claim 45 recites light generating means for controlling a direction of polarization of near-field light so that the direction of polarization of the near-field light irradiated on the at least one linear mark is orthogonal to a longitudinal axis of the at least one linear mark. Claim 49 recites the step of irradiating at least one of the linear marks in the respective information unit field of the medium with the near-field light while controlling a direction of polarization of the near-field light so that the direction of polarization of the near-field light irradiated on the at least one linear mark is orthogonal to a longitudinal axis of the at least one linear mark.

The combined teachings of Hiroshi and Hajjar do not disclose or suggest the specific orthogonal relationship between the direction of polarization of the near-field light and the longitudinal axis of the linear mark (claims 45, 49) or of each of the linear marks (claim 41), as set forth above for independent claim 36. EP 0552887 also does not disclose

or suggest this feature and, therefore, does not cure the deficiencies of Hiroshi as modified by Hajjar. Accordingly, one ordinarily skilled in the art would not have been led to modify the references to attain the claimed subject matter.

Claims 42, 43, 46-47, 50, 51, 53, 57, 61 and 65 depend on corresponding claims 41, 45 and 49 and, therefore, distinguish from the cited references at least in the same manner as claims 41, 45 and 49.

In view of the foregoing, applicants request that the rejection of claims 41-43, 45-47, 49-51, 53, 57, 61 and 65 under 35 U.S.C. §103(a) as being unpatentable over Hiroshi in view of Hajjar and further in view of EP 0552887 be withdrawn.

Claims 39, 44, 48, 52, 54-56, 58-60, 62-64, and 66-68 were rejected under 35 U.S.C. §103(a) as being unpatentable over various combinations of the references to Hiroshi, Hajjar, Lemelson, Morisawa, Albrecht et al., Ohnuki et al., and Wickramasinghe et al.

Hiroshi in view of Hajjar do not disclose or suggest the subject matter recited in independent claims 36, 41, 45 and 49 as set forth above for the rejections of these claims under 35 U.S.C. §103(a). Claims 39, 44, 48, 52, 54-56, 58-60, 62-64, and 66-68 depend on corresponding independent claims 41, 45 and 49 and, therefore, distinguish from the combined teachings of Hiroshi and Hajjar at least in the same manner as claims 41, 45 and 49.

The secondary references to Lemelson, Morisawa, Albrecht et al., Ohnuki et al., and Wickramasinghe et al. have been cited by the Examiner for their disclosure of isolated features recited in dependent claims 39, 44, 48, 52, 54-56, 58-60, 62-64, and 66-68. However, the secondary references do not cure the deficiencies of Hiroshi as modified by Hajjar, including the lack of disclosure or suggestion of the specific orthogonal relationship between the direction of polarization of the near-field light and the longitudinal axis of the linear mark (claims 36, 45, 49) or of each of the linear marks (claim 41), as recited in claims 36, 41, 45 and 49, from which claims 39, 44, 48, 52, 54-56, 58-60, 62-64, and 66-68 depend. Accordingly, one ordinarily skilled in the art would not have been led to modify the references to attain the claimed subject matter.

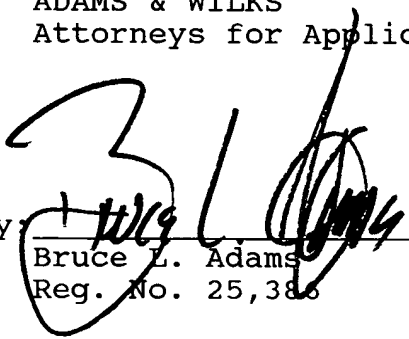
In view of the foregoing, applicants request that the rejections of claims 39, 44, 48, 52, 54-56, 58-60, 62-64, and 66-68 under 35 U.S.C. §103(a) as being unpatentable over various combinations of the references to Hiroshi, Hajjar, Lemelson, Morisawa, Albrecht et al., Ohnuki et al., and Wickramasinghe et al. be withdrawn.

In view of the foregoing amendments and discussion,
the application is believed to be in allowable form.
Accordingly, favorable reconsideration and allowance of the
claims are most respectfully requested.

Respectfully submitted,

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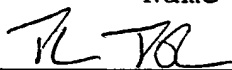
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